In all years displayed, Montana's overall (i.e. all cause) age-adjusted death rates are below those for the U.S. Montana's age-adjusted rates are also below those for the U.S. for many of the chronic diseases displayed; Montana's rates for heart disease, cancer, nephritis, homicide and legal intervention, and chronic liver disease and cirrhosis and were lower than those for the U.S in eight or nine of the nine years for which both Montana and U.S. values are displayed. These underlying causes accounted for slightly less than half (48.2%) of all deaths of Montanans in 2002.

Montana's rates for cerebrovascular disease, pneumonia and influenza, and diabetes showed inconsistent relationships with the U.S. rates, with the trend lines crossing each other more than once in this period. Diabetes rates for Montana were higher than those for the U.S. in three of the six years in which underlying cause of death was determined with the rules of ICD-9 and one time there after. The U.S. diabetes rate seems relatively unaffected by the conversion to ICD-10. The Montana diabetes rate appears less stable since the conversion, but this may be the result of a change in a relatively small number of deaths from diabetes and have nothing to do with the revision of ICD. Montana's rates for cerebrovascular disease were higher than those of the U.S. for four of the six years in which ICD-9 coding rules were used. Montana and U.S. rates for this cause have been nearly identical under ICD-10 coding rules.

The state rates for chronic lower respiratory disease (C.L.R.D.)--which includes chronic and unspecified bronchitis, emphysema, and asthma--were higher than those for the U.S. in all years displayed. Revision of ICD did not change this relationship. Montana's Alzheimer's rate was virtually the same as that of the U.S. in 1997, but higher in all other years and is increasing. Revision of ICD substantially increased Alzheimer's rate for both Montana and U.S.

Montana's rates for most unintentional traumatic causes of death; accidents (both motor vehicle and non-motor-vehicle) and suicide were higher than those for the nation in all years displayed, irrespective of the ICD coding rules. While U.S. death rates for accidents seem stable, Montana's are increasing for (for both motor vehicle and non-motor- vehicle accidents). Neither the accident nor the suicide rates appear to have been affected greatly by ICD revision.

These graphs show secular (i.e. long-term, despite instability in the short-term at times) reductions in Montana's overall death rates and rates for specific chronic diseases such as heart disease, cancer, cerebrovascular disease, and pneumonia and influenza. The rates for Alzheimer's, chronic liver disease and cirrhosis, and nephritis are on the increase, although the trends are somewhat inconsistent and, in some cases, possibly affected by the conversion of ICD coding. The rates for homicide and legal intervention also appear to be declining slightly.

The rates for C.L.R.D and suicide are apparently neither increasing nor decreasing consistently.

For both Montana and the U.S., age-adjusted death rates for nephritis and Alzheimer's increased after the introduction of ICD-10, suggesting that, to some degree, the increase reflects conversion to the new revision of ICD. The rate for pneumonia and influenza decreased after the conversion to ICD-10. These results are consistent with the comparability ratios for these causes discussed earlier. (See **Figure 1** in the Technical Overview.)

AGE, SEX, AND RACE

Cause of death is age, sex, and race-dependent. In 2002, heart disease and cancer were the first and second leading causes of death in Montana, claiming the largest numbers of persons of all races and both sexes. However, males were slightly more likely than females to die of these causes. While slightly more of the white

decedents were female (51.2%) than male (48.8%), a higher proportion of the whites who died of heart disease were males (52.9%). Of the whites who died of cancer, 50.5% were male. Males made up 72.8% of the motor vehicle accidental deaths for whites, 58.0% of the non-motor-vehicle accidental deaths, 81.9% of the suicides and 100% of the deaths due to Human Immunodeficiency Virus (HIV).

Females accounted for more than three-fifths (61.7)% of the deaths among white residents due to cerebrovascular disease; the female proportions among whites are 54.0% for deaths due to CLRD, 70.8% for Alzheimer's and 53.5% for pneumonia and influenza.

The leading causes of death among Native Americans were cancer (19.6%), accidents (17.6%) and then heart disease (15.7%). Males accounted for 56.1% of the deaths from all causes among Native Americans. Deaths of males accounted for 64.7% of the heart disease deaths, 47.1 % of the cancer deaths, 57.7% of the motor-vehicle accidental deaths, and 62.5% of the non-motor-vehicle accidental deaths for Native Americans.

The proportions of female deaths among Native Americans for cerebrovascular disease deaths, CLRD, Alzheimer's, and pneumonia and influenza were 81.8, 55.0, 80.0, and 44.4, respectively.

For whites of both sexes, accidents were the fifth leading cause of death but ranked second for Native Americans. Suicide was the ninth leading cause of death for whites but ranked seventh for Native Americans.

Females of all races who died of heart disease tended to be older than males, although this disparity tended to diminish after age 49. After 55 years of age, the proportion that died from heart disease was essentially the same as that for men and women. Persons less than 50 years old who died of cancer were most often women; those older than 50 were most often men. Most cancer deaths occurred after the age of 55 for both sexes.

The frequency of Montana resident deaths by sex and age is shown in **Table D-1** for 358 selected causes of death. The frequency of death by sex and race is shown in **Table D-2** for 113 selected causes of death. These causes are used by National Center for Health Statistics (NCHS) for ranking causes of death. Those causes preceded by a pound sign (#) are used for ranking causes for decedents of all ages. **Figure 47** shows, graphically, the percent distribution for over three-quarters (77.0%) of these deaths by cause and race categories for males. **Figure 48** shows the distribution among these underlying causes of death for females.

As a proportion of all deaths for the year, circulatory system diseases (which include the first and third "rankable" causes of death—heart disease and cerebrovascular disease—as well as atherosclerosis) accounted for the greatest percentage of deaths of all causes shown for the white population (33.7% of white males and 33.3% of white female decedents). Only 21.8% of Native American males and 18.4% of female decedents died of diseases of the circulatory system. Almost 24% of female Native Americans died from cancer (ranked number one) compared to 16.5% of the Native American males (ranked number three).

Homicide, suicide, chronic liver disease and cirrhosis, and conditions originating in the perinatal period did not constitute large percentages of deaths in any of these groups, but the distribution among races and sexes is of interest. The proportion of deaths from homicides for Native American males was 2.9 %, roughly 14 times that for white males (0.2%). Predominantly, those who committed suicide were males--140 white male deaths and eight Native American males, compared to 31 white and three Native American females.

About six-tenths of one percent of white males and 0.5% of white female decedents died of chronic liver disease and cirrhosis. These proportions were much larger for Native American males (1.23 %) and females (2.1%). Three percent of Native American male decedents and 0.5% of Native American female decedents died of

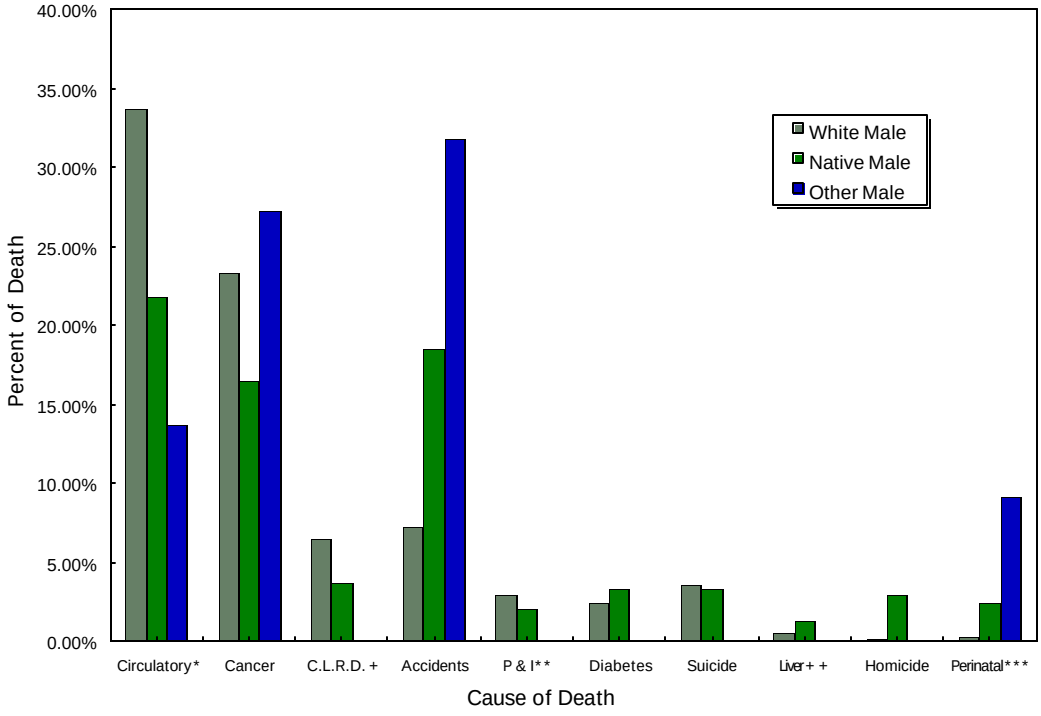
conditions originating in the perinatal period. Corresponding proportions for white decedents were 0.3% and 0.2% for males and females, respectively. Twenty of the 29 deaths due to conditions originating in the perinatal period were males.

Those who died of heart disease were most likely men older than age 35. After 35, the deaths due to heart disease were predominantly men until after 55 years of age; then the women's proportion was roughly equal to that of men. Victims of accidental death in 2002 were most likely to be men in their late teens to early twenties or in their early forties. The Montana resident committing suicide was likely to be a man, nearly 18% were males younger than 25 years old but half (52%) were between 25 and 54 years old; in all age groups, firearms were the most common method. Montana resident homicide victims were most likely to be males (14 males compared to 9 females). Nearly 39% of the homicides (of both sexes) involved use of a firearm; four of the nine female homicides were committed with a firearm (44%).

Table D-1 also shows the frequency of accidental deaths of Montanans by age at death and type of accident. Motor vehicle accidents accounted for the majority of accidental deaths for those from 1 to 64 years of age (84%).

Figure 47

PERCENT DISTRIBUTION OF DEATHS BY SELECTED CAUSE AND RACE
MALE MONTANA RESIDENTS, 2002

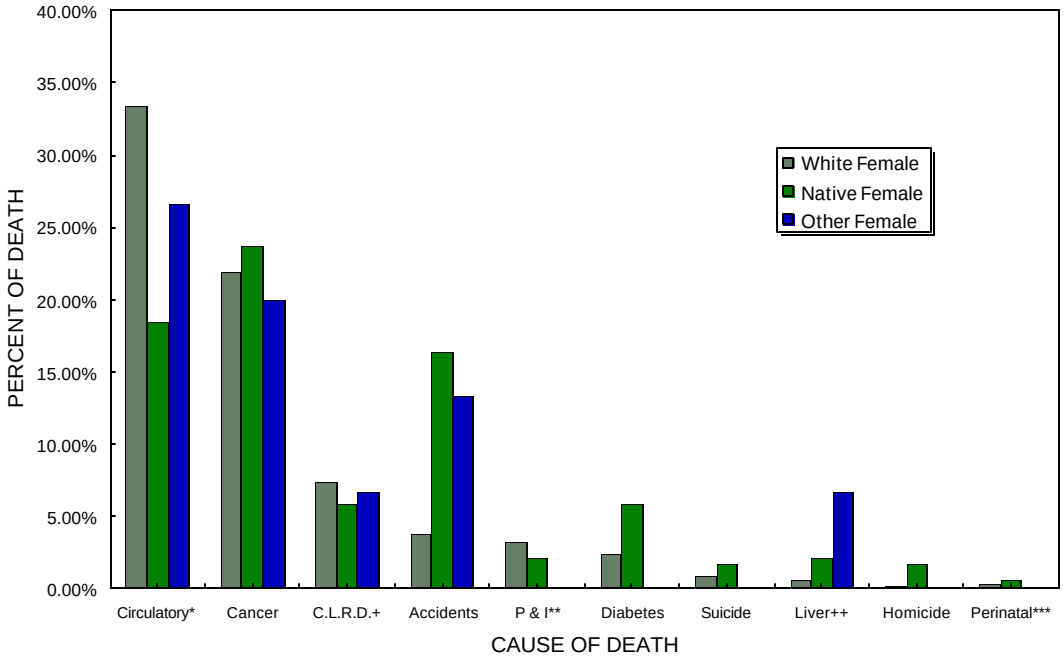


* Diseases of the Circulatory system
\+ Chronic Lower Respiratory Disease (C.L.R.D.)
** Pneumonia and Influenza
++ Chronic Liver Disease and Cirrhosis
*** Certain Conditions Originating in the Perinatal Period

Figure 49 displays leading causes of death by age group for Montana residents. In 2002, sudden infant death syndrome, certain conditions originating in the perinatal period, and congenital anomalies, accounted for 76.5% of the infant deaths. Deaths due to conditions originating in the perinatal period—including maternal factors and complications of labor and delivery, birth trauma, infections, and respiratory, cardiovascular, and digestive system disorders specific to this period— were the leading cause of death in the "under one year" age category—(35.8%), followed by congenital anomalies—including malformations of the nervous system, eye, ear, face, neck, and circulatory, respiratory, and digestive systems—(22.2%). **Table D-7** displays the frequency of infant death by race, age in days, and 130 selected causes of death. Those causes preceded by a pound sign (#) are used for ranking causes for infants only. Only 15 Montana decedents were between the ages of one and four years in 2002. Accidents (33.3%), congenital anomalies (13.3%), heart disease (13.3%), cancer (6.7%)and homicide (6.7%) were the leading cause of death for these decedents.

Figure 48

PERCENT DISTRIBUTION OF DEATHS BY SELECTED CAUSE AND RACE
FEMALE MONTANA RESIDENTS, 2001



* Diseases of the Circulatory system
\+ Chronic Lower Respiratory Disease (C.L.R.D.)
** Pneumonia and Influenza
++ Chronic Liver Disease and Cirrhosis
*** Certain Conditions Originating in the Perinatal Period

Accidents were more likely to cause the deaths of the young than the old. They accounted for 16% of the deaths of those 14 years of age or younger, 58.3% of the deaths of those between the ages of 15 and 24, and 43.8% of those between the ages of 25 and 34 years. By contrast, accidents accounted for 6.2% of the deaths in the entire population. Suicide was the cause of death for 17.3% of the decedents between the ages of 15 and 44. By contrast, it was the cause of death for only 2.1% of decedents of all ages. Of the suicide victims, 81.3% were males. Males preferred to use firearms (68.2%) while females preferred poison (44%) followed by firearms (38%).

For decedents more than 34 years of age, chronic diseases—particularly heart disease and cancer—increased in influence. Cancer, followed by heart disease, was the leading cause of death for all of the age categories between 45 and 74 years. However, for the age categories 75 and older, heart disease was the leading cause, with cancer second.

For the all-age category, heart disease (22.8 %) was the leading cause of death, followed closely by cancer (22.4%). Cerebrovascular disease (7.5 %), C.L.R.D. (6.8%), and accidents (6.2%) were a distant third, fourth, and fifth, respectively. Frequencies and crude rates for the ten leading causes of death are shown for Montana and each of its counties in **Table S-6**.